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ELECTROPHOTOGRAPHY

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27 Claims. (Cl. 95—5)

This invention relates to photography.

An object of the invention is to improve methods of photography and to provide improved means and devices for use in photography.

Other objects of the invention will be apparent from the following description and accompanying drawing taken in connection with the appended claims.

The invention comprises the features of construction, combination of elements, arrangement of parts, and methods of manufacture and operation referred to above or which will be brought out and exemplified in the disclosure hereinafter set forth, including the illustration in the drawing.

In the drawing:

Figure 1 is a section through a photographic plate according to my invention and illustrates a preferred method of applying an electric charge to it preparatory to photographic exposure;

Figures 2, 2a and 2b illustrate three methods of photographically exposing the plate;

Figures 3 and 4 show a method of developing the electrostatic latent image produced on the plate by the preceding steps;

Figure 5 shows a method of transferring the image to a sheet of suitable material such as paper;

Figures 6 and 7 illustrate methods of fixing the image onto the sheet;

Figure 8 illustrates a modified means for charging and exposing the photographic plate;

Figure 9 shows another method of developing the image; and

Figure 10 is an enlargement of a half-tone produced by the process.

A feature of the present invention resides in the use of photoelectric or photoconductive materials for photographic purposes. In its preferred form the invention involves the use of materials which are insulators in the dark but which become partial conductors when illuminated. These materials respond to light, being slightly conductive whenever they are illuminated and again becoming insulating when the light is cut off. They can be called photoconductive insulating materials.

In carrying out the invention the photoconductive insulating material is used to control electric charges in such a way as to produce an electrostatic latent image (so named by its analogy to the ordinary photographic latent image). The electrostatic latent image is then developed to make a visible picture as will be more fully described in the following detailed specification.

While a preferred embodiment of the invention is described herein, it is contemplated that considerable variation may be made in the method of procedure and the construction of parts without departing from the spirit of the invention. In the following description and in the claims, parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring to the drawing Figure 1 shows a cross-section of a photographic plate 20 according to the invention comprising a thin layer 21 of photoconductive insulating material bonded to a metal plate 22.

Any one of a variety of photoconductive insulating materials may be used for layer 21. Following are a few of the materials which I have found suitable: (1) sulfur, (2) anthracene, (3) anthraquinone, (4) melted mixtures of sulfur and selenium with the sulfur predominating, (5) melted mixtures of sulfur with up to a few percent of anthracene, (6) the compound formed by heating and melting together sulfur and anthracene in proportions of about 1 part sulfur to three parts anthracene by weight, the heating being continued until reaction is complete, (7) linseed oil boiled with sulfur and dried in a thin layer.

Other photoconductive materials having insulating characteristics in the dark may also be used.

The plate 22 may be of almost any suitable metal which does not deleteriously react with the photoconductor used. Zinc or aluminum plates are suitable for sulfur and anthracene layers. Brass may also be used. The surface of the metal may be etched to improve the adherence of the photoconductive layer.

Sulfur coated plates may be prepared by placing a few crystals of pure sulfur onto the etched surface of the metal plate and heating the plate until the sulfur melts, then flowing the sulfur uniformly over the surface of the plate and allowing any excess to run off, and cooling the plate to solidify the layer. If desired the layer can be made thinner and smoothed with fine emery paper after it has solidified, finishing with a polishing powder such as chalk.

Anthracene and anthraquinone coated plates may be made by melting the material onto an etched metal plate and quickly cooling the plate in cold water, whereby a thin glossy layer is obtained on the plate. However, due to the strong tendency of these materials to sublime or evapo-